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## PIONEER 10 AND 11

NC 473657

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TDS Mgr: A. Berman  
NOPE: A. Short

Project Mgr: R. Fimmel (ARC)  
MOM: D. Lozier (ARC)

Launch Date: Pioneer 10 - March 2, 1972; Pioneer 11 - April 5, 1973  
Projected SC Life/DSN Support: December 1996/December 1995

Project Responsibility: Ames Research Center (ARC)

Source: SIRD September 1983/NSP June 1984  
Sponsor: OSO

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### A. MISSION DESCRIPTION

The primary objective of the Pioneer 10 and 11 missions is to investigate the interplanetary medium beyond the orbit of Saturn and, in particular, to gather data which may locate the heliopause as these spacecraft cruise out of the solar system to the extreme of their communication capabilities.

### B. FLIGHT PROFILE

After it encountered Jupiter in 1973, Pioneer 10 began its departure from the solar system in the direction of the solar apex. Pioneer 11 encountered Jupiter in 1974 and Saturn in 1979; it also will leave the solar system, but in the opposite direction of Pioneer 10.

## C. COVERAGE

## 1. Coverage Goals

<u>Mission</u>	<u>Mission Phase</u>	<u>Period</u>	<u>Passes/Month</u>	<u>Antennas</u>
Pioneer 10	Cruise	1/89-1/95	60	70m
Pioneer 11	Cruise	10/89-1/95	60	70-m

## 2. Network Support

The support provided by the DSN is indicated in the following table:

<u>System</u>	<u>Goldstone</u>				<u>Canberra</u>				<u>Madrid</u>		
	12	14	15	16	42	43	45	46	61	63	66
S-band TLM	P	P			P	P			P	P	
S-band CMD	P	P			P	P			P	P	
S-band TRK	P	P			P	P			P	P	

NOTE: P = Prime

## D. FREQUENCY ASSIGNMENTS

Frequencies are allocated according to the following table:

<u>System</u>	<u>Uplink (MHz)</u>	<u>Downlink (MHz)</u>	<u>Polarization</u>
S-band TLM	-	2292.407407 2292.407407	RCP
S-band CMD	2110.584/ 2110.925	-	RCP
S-band TRK	2110.584/ 2110.925	2292.037037/ 2292.407407	RCP

## E. SUPPORT PARAMETERS

The support parameters for the Telemetry, Command, and Support Systems are listed below:

## (1) Telemetry

Data Streams	1
Format	PCM(NRZ-L) / PSK / PM
Subcarrier Frequency	32 kHz
Bit Rate	16, 32, 64, 128, 256, 512, 1024, 2048 b/s
Record	Required
Coding	Convolutional, K = 32 R = 1/2

## (2) Command

Format	PCM/FSK/PM
Bit Rate	16 b/s (equivalent)
Subcarrier Frequencies	128.0, 204.8 Hz
Subcarrier Waveform	Sine

## (3) Support

Uplink Power	10 to 20 kW
Antenna Rate	Sidereal
Antenna Angle Data	Not required
Antenna Autotrack	Not required
Doppler Rates	Moderate
Range Format	None
Recording	
. Analog	Not required
. Digital	Required

## F. TRACKING SUPPORT RESPONSIBILITY

The allocation of responsibilities for tracking support is listed in the following table:

<u>Mission Phase</u>	<u>Support Responsibility</u>
Planetary	DSN

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